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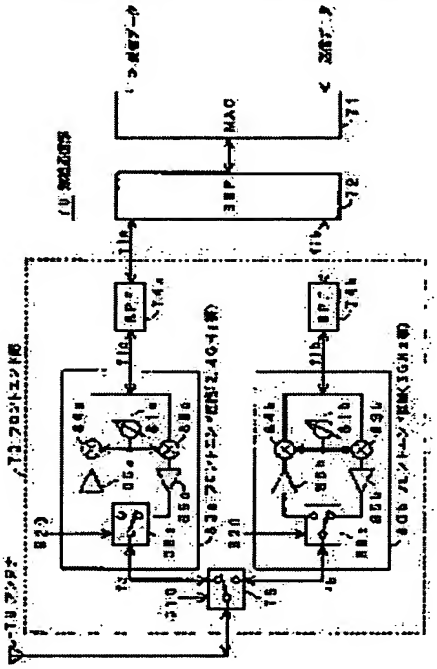
(54) WIRELESS COMMUNICATION SYSTEM AND WIRELESS COMMUNICATION UNIT

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a wireless communication unit that can considerably increase the number of channels to be set simultaneously in the same area in a wireless LAN system and can remarkably preclude the possibility of occurrence of an intermitted communication link due to a disturbing radio wave.

SOLUTION: A wireless communication section 70 is provided with a front end circuit 80a for a 2.4 GHz band and a front end circuit 80b for a 5 GHz band so as to be compatible with two frequency bands of 2.4 GHz and 5 GHz. When a communication channel is set in the 2.4 GHz band, the front end circuit 80a converts an intermediate frequency signal with a frequency (fia) after modulation from a BBP(base band processor) 72 into a high frequency signal with a frequency (fa). In the case of reception, the front end circuit 80a converts a high frequency signal with the frequency (fa) received from other wireless communication unit into the intermediate frequency signal with the frequency (fia).



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* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The baseband processing section which restores to the intermediate frequency signal which the data to transmit were modulated, and it changed into the intermediate frequency signal, or the received high frequency signal was changed, and was acquired, Change the intermediate frequency signal from this baseband processing section into a RF signal, and it transmits. It has the front end section which changes the received high frequency signal into an intermediate frequency signal, and is supplied to said baseband processing section. Or this front end section The radio communication equipment which makes a radio frequency the frequency set up within one frequency band with which it should correspond to two or more frequency bands, and was chosen in two or more of the frequency bands.
[Claim 2] It is a radio communication equipment equipped with two or more front end circuits where said front end section corresponded to each of two or more of said frequency bands in the radio communication equipment of claim 1.
[Claim 3] It is a radio communication equipment equipped with the front end circuit where said front end section is shared by said two or more frequency bands in the radio communication equipment of claim 1.
[Claim 4] The radio communication equipment equipped with two or more antennas corresponding to each of two or more of said frequency bands in the radio communication equipment of claim 1.
[Claim 5] The radio communication equipment equipped with the antenna shared by said two or more frequency bands in the radio communication equipment of claim 1.
[Claim 6] It is the radio communication equipment which is that in which said two or more frequency bands contain an at least 2.4GHz band and a 5GHz band in the radio communication equipment of claim 1.
[Claim 7] A radio device equipped with the appliance control section which chooses one frequency band from said two or more frequency bands, and sets up a radio frequency within the selected frequency band while having the radio communication equipment of claim 1 as the Radio Communications Department.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the radio device which constitutes a wireless LAN (Local Area Network) system, and the radio communication equipment which constitutes the Radio Communications Department of this radio device.
[0002]
[Description of the Prior Art] In [, such as the inside of a residence, and a section indoor,] the limited area, the wireless LAN system was built, it is possible among two or more devices, to transmit and receive data, and the 2.4GHz band is prescribed by IEEE(The Institute of Electrical and Electronics Engineers, Inc.) 802.11 specification as a radio frequency band which can be used for such a wireless LAN system.
[0003] Drawing 12 shows the conventional radio communication equipment which constitutes the wireless LAN system of this 2.4GHz band. At the time of data transmission, in MAC (Media Access Controller)91 from which the data transmitted constitute the packet-assembly-and-disassembly section, it is made a packet configuration for data transmission, and in BBP (Base Band Processor)92 which constitutes the strange recovery section, it becomes irregular at a high transmission rate, and the data of that packet configuration are changed into the intermediate frequency signal around several 100MHz in this radio communication equipment. Furthermore, the intermediate frequency signal is changed into the RF signal of the radio frequency chosen within the 2.4GHz band in the front end section 93, and the RF signal is transmitted from an antenna 99.
[0004] At the time of data reception, it is received by the antenna 99, the RF signal transmitted from other radio communication equipments is changed into an intermediate frequency signal in the front end section 93, the intermediate frequency signal gets over by BBP92, and the data of a packet configuration are obtained from BBP92. Furthermore, a packet configuration is solved by MAC91 and, as for the data of the packet configuration, received data are obtained from MAC91.
[0005] As a strange recovery method in BBP92, CCK (ComplementaryCode Keying), OFDM (Orthogonal Frequency Division Multiplexing), QPSK (Quadrature Phase Shift Keying), etc. are used.
[0006]
[Problem(s) to be Solved by the Invention] By the above-mentioned wireless LAN system, there is about 100m of data transmission possible distance between devices by the optical distance. Therefore, if a wireless LAN system is built for every residence or room, in order to penetrate and spread the wall with which an electric wave does not contain a metal in the building where the inside of the area where a residence crowds, and the room approach, two or more wireless LAN systems will exist at coincidence in one area in which data transmission is possible.
[0007] On the other hand, by IEEE802.11 specification, as shown in drawing 13 , although the frequency of 11 channels from a channel 1 to a channel 11 is assigned, when setting two or more channels as coincidence in the same area, setting frequency spacing of an adjacent channel to 25MHz or more is defined in the 2.400-2.483GHz 2.4GHz band. This is because the signal of each channel will serve as jamming to the other party mutually if the frequency of an adjacent channel is close, since the high frequency signal transmitted and received is what has the modulated fixed band.

[0008] Therefore, the number of channels which can be set as coincidence in the same area is restricted to three channels at the maximum, as drawing 13 shows as channels 1, 6, and 11, and in the building where the inside of the area where a residence crowds as mentioned above, and the room approach, if it is going to build a wireless LAN system for every residence or room, it will produce the lack of a channel.
[0009] But carrying out the share of the idle time of the same channel, the device according to IEEE802.11 specification is equipped with the communications protocol which secures a communication link, though a transmission rate is dropped.
[0010] However, in the area of a wireless LAN system, and the frequency band of a 2.4GHz band, electric waves which are blocked to the communication link of the wireless LAN system according to IEEE802.11 specification, such as a leakage electric wave of a microwave oven and a message electric wave of a digital cordless telephone, may exist. In the place where such jamming exists, if a wireless LAN system tends to perform real-time transmission of image data or voice data, the problem of data transmission breaking off and it becoming impossible for an image and voice to transmit and receive turbulence or data by jamming will be produced.
[0011] Moreover, by IEEE802.11 specification, the 5GHz band was wide opened as a frequency band of a wireless LAN system recently. Then, using a 5GHz band instead of a 2.4GHz band is also considered as a frequency band of a wireless LAN system.
[0012] However, also about the 5GHz band, since it is the same as that of the case of a 2.4GHz band, when setting two or more channels as coincidence in the same area, setting frequency spacing of an adjacent channel to 20MHz or more is defined.
[0013] Therefore, the number of channels which can be set as coincidence in the same area also about a 5GHz band will produce the lack of a channel, if it is going to build a wireless LAN system for every residence or room in the building where the inside of the area where a residence crowds, and the room approach when it is restricted to four channels at the maximum as shown in drawing 14 , and the above jamming exists or.
[0014] Then, this invention can make the number of channels which can be set as coincidence in the same area increase sharply, and offers the radio communication equipment and radio device for wireless LAN systems which can reduce remarkably a possibility that a communication link may break off by jamming.
[0015]
[Means for Solving the Problem] The baseband processing section which restores to the intermediate frequency signal which the radio communication equipment of this invention modulated the data to transmit, and changed them into the intermediate frequency signal, or the received high frequency signal was changed, and was acquired, Change the intermediate frequency signal from this baseband processing section into a RF signal, and it transmits. It has the front end section which changes the received high frequency signal into an intermediate frequency signal, and is supplied to said baseband processing section. Or this front end section It should correspond to two or more frequency bands, and let the frequency set up within one frequency band with which it was chosen in two or more of the frequency bands be a radio frequency.
[0016] In this case, the front end section shall be equipped with the front end circuit which shall be equipped with two or more front end circuits corresponding to each of two or more frequency bands, or is shared by two or more frequency bands.
[0017] Moreover, two or more frequency bands shall contain an at least 2.4GHz band and a 5GHz band.
[0018] The radio device of this invention shall be equipped with the appliance control section which chooses one frequency band from said two or more frequency bands, and sets up a radio frequency within that selected frequency band while it is equipped with the above-mentioned radio communication equipment as the Radio Communications Department.
[0019] By the radio communication equipment and radio device of this invention which were constituted as mentioned above, the front end section should correspond to two or more frequency bands, with any frequency band in two or more frequency bands, since a channel setup is possible, the number of channels which can be set as coincidence in the same area increases sharply, and a possibility that a communication link may break off decreases remarkably by jamming.

[0020] Below, "two or more frequency bands" is called a "multi-band" by making "2 or more" into "multi."
[0021]
[Embodiment of the Invention] [Outline -- drawing 1 of an example of a wireless LAN system and a radio device - drawing 3] Drawing 1 shows an example of a wireless LAN system which used the radio device of this invention. The wireless LAN system of this example is constituted by the radio device 10 as a base terminal, and the radio device 40 as a portable terminal. Hereafter, "the radio device 10" is abbreviated to "a device 10", and "the radio device 40" is abbreviated to "a device 40."
[0022] As for the device 10 as a base terminal, the telephone line 1 is connected, and the device 40 as a portable terminal minds a device 10. While sending a telephone, receiving arrival of the mail and being able to connect with the network of the exteriors, such as the Internet Devices, such as STB (Set Top Box: receiver)3, the DVD player 4, and digital VTR 5, are connected, and the device 40 as a portable terminal has the image data and voice data from these devices received through a device 10.
[0023] Furthermore, it shall have a device 10 in the Radio Communications Department 70 of the below-mentioned multi-band configuration, an antenna 79, a control unit 17, and the appliance control section 20 as shown in drawing 2 .
[0024] It shall have the device 40 as a portable terminal in the Radio Communications Department 70 of the below-mentioned multi-band configuration, an antenna 79, a control unit 47, and the appliance control section 50 as shown in drawing 3 while having LCD41 for image display (Liquid Crystal Display), the loudspeaker 43 for voice outputs, and the microphone 45 for voice input.
[0025] As shown in drawing 2 , the appliance control section 20 of a device 10 has CPU21, and RAM24 which functions as a work area of ROM23 and CPU21 where the program which CPU21 should perform, fixed data, etc. were written in is connected to the bus 22.
[0026] Moreover, the telephone line 1 is connected to a bus 22 through a modem 31, and STB3, the DVD player 4, digital VTR 5, and a control unit 17 are connected to it through interface circuitries 33, 34, 35, and 37, respectively.
[0027] The Radio Communications Department 70 of a device 10 is constituted by MAC71 which constitutes the packet-assembly-and-disassembly section, BBP72 which constitutes the strange recovery section, and the front end section 73 corresponding to a multi-band.
[0028] The MAC71 is connected to a bus 22 through input/output port 25, and while the data (a command is included) transmitted to the device 40 as a portable terminal are inputted into MAC71 from a bus 22, the data (a command is included) which were transmitted from the device 40 and received in the Radio Communications Department 70 of a device 10 are outputted to a bus 22 from MAC71.
[0029] Moreover, MAC71 is connected to a bus 22 through an interface circuitry 26, and control signals outputted to a bus 22, such as the below-mentioned band selection signal and a transmission-and-reception change-over signal, are supplied to BBP72 and the front end section 73 through MAC71.
[0030] As shown in drawing 3 , the appliance control section 50 of a device 40 has CPU51 like the appliance control section 20 of the device 10 shown in drawing 2 , and ROM53 and RAM54 are connected to the bus 52.
[0031] Moreover, while LCD41 is connected through the display-control circuit 61, a loudspeaker 43 is connected through an interface circuitry 62 and D/A converter 63 and a microphone 45 is connected through an interface circuitry 65 and A/D converter 64, a control unit 47 is connected to a bus 52 through an interface circuitry 67.
[0032] The Radio Communications Department 70 of a device 40 is also constituted by MAC71 which constitutes the packet-assembly-and-disassembly section, BBP72 which constitutes the strange recovery section, and the front end section 73 corresponding to a multi-band.
[0033] The MAC71 is connected to a bus 52 through input/output port 55, and while the data (a command is included) transmitted to the device 10 as a base terminal are inputted into MAC71 from a bus 52, the data (a command is included) which were transmitted from the device 10 and received in the Radio Communications Department 70 of a device 40 are outputted to a bus 52 from MAC71.
[0034] Moreover, MAC71 is connected to a bus 52 through an interface circuitry 56, and control

signals outputted to a bus 52, such as the below-mentioned band selection signal and a transmission-and-reception change-over signal, are supplied to BBP72 and the front end section 73 through MAC71.

[0035] As mentioned above, the Radio Communications Department 70 of the device 10 as a base terminal and the Radio Communications Department 70 of the device 40 as a portable terminal are considered as the same configuration. Hereafter, the Radio Communications Department 70, i.e., the operation gestalt of a radio communication equipment, is shown.

[0036] [The 1st operation gestalt -- drawing 4 of a radio communication equipment (Radio Communications Department) - drawing 7] With the 1st operation gestalt, the Radio Communications Department 70 should be corresponded to two frequency bands, a 2.4GHz band and a 5GHz band.

[0037] (The 1st example -- Drawing 4) Drawing 4 shows the 1st example of the 1st operation gestalt. In this example, it shall have the switch 75 which is equipped with front end circuit 80a of a 2.4GHz band, and front end circuit 80b of a 5GHz band, and connects alternatively [one] of both the front end section 73 of the Radio Communications Department 70 to the common antenna 79.

[0038] Moreover, the band pass filters 74a and 74b this example of whose is the intermediate frequency filter of business at the front end section 73, respectively in the case where an intermediate frequency is changed in the time of each of a 2.4GHz band and a 5GHz band being chosen are formed.

[0039] Front end circuit 80a of a 2.4GHz band is constituted by VCO(Voltage Controlled Oscillator) 81a for a from station, mixer 83a for the rise convert at the time of transmission, mixer 84a for the down convert at the time of reception, power amplification 85a for transmission, low noise amplifier 86a for reception, and switch 88a for a transmission-and-reception change-over.

[0040] Front end circuit 80b of a 5GHz band is similarly constituted by VCO81b for a from station, mixer 83b for the rise convert at the time of transmission, mixer 84b for the down convert at the time of reception, power amplification 85b for transmission, low noise amplifier 86b for reception, and switch 88b for a transmission-and-reception change-over.

[0041] In addition, the concrete configuration of the front end circuits 80a and 80b can change suitably inserting a filter between a mixer and amplifier, and changing an intermediate frequency signal into a RF signal with two or more steps of mixers, and changing a RF signal into an intermediate frequency signal for controlling spurious emission etc., etc. if needed.

[0042] CCK, OFDM, QPSK, etc. which were mentioned above can be used as a strange recovery method in BBP72.

[0043] In this example, by the appliance control sections 20 and 50 shown in drawing 2 and drawing 3 When a 2.4GHz band as shown in drawing 1313 as a radio frequency band is chosen and a communication channel is set up within a 2.4GHz band At the time of transmission, the data transmitted are made a packet configuration by MAC71. It becomes irregular by BBP72, the data of the packet configuration are changed into the intermediate frequency signal of the frequency fia around several 100MHz, and the intermediate frequency signal is supplied to front end circuit 80a of a 2.4GHz band through band pass filter 74a.

[0044] The oscillation frequency of VCO81a of front end circuit 80a The intermediate frequency signal which was controlled by the frequency according to the frequency fa of the set-up communication channel, and was supplied to front end circuit 80a It is changed into the RF signal of a frequency fa by mixer 83a. The RF signal It is amplified by power amplification 85a, and is transmitted from an antenna 79 through the switch 75 switched to the front end circuit 80a side by the band selection signal S10 through switch 88a switched to the transmitting side by the transmission-and-reception change-over signal S20.

[0045] At the time of reception, it is received by the antenna 79, the RF signal of the frequency fa transmitted from other radio devices is supplied to front end circuit 80a through the switch 75 switched to the front end circuit 80a side, and it is amplified by low noise amplifier 86a through switch 88a switched to the receiving side, and is changed into the intermediate frequency signal of a frequency fia by mixer 84a.

[0046] It restores to the intermediate frequency signal by BBP72 through band pass filter 74a, and the data of a packet configuration are obtained from BBP72. Furthermore, a packet configuration is

solved by MAC71 and, as for the data of the packet configuration, received data are obtained from MAC71.
[0047] When a 5GHz band as shown in drawing 14 as a radio frequency band is chosen on the other hand and a communication channel is set up within a 5GHz band At the time of transmission, the data transmitted are made a packet configuration by MAC71. It becomes irregular by BBP72, the data of the packet configuration are changed into the intermediate frequency signal of the frequency fib around several 100MHz, and the intermediate frequency signal is supplied to front end circuit 80b of a 5GHz band through band pass filter 74b.
[0048] The oscillation frequency of VCO81b of front end circuit 80b The intermediate frequency signal which was controlled by the frequency according to the frequency fb of the set-up communication channel, and was supplied to front end circuit 80b It is changed into the RF signal of a frequency fb by mixer 83b. The RF signal It is amplified by power amplification 85b, and is transmitted from an antenna 79 through the switch 75 switched to the front end circuit 80b side by the band selection signal S10 through switch 88b switched to the transmitting side by the transmission-and-reception change-over signal S20.
[0049] At the time of reception, it is received by the antenna 79, the RF signal of the frequency fb transmitted from other radio devices is supplied to front end circuit 80b through the switch 75 switched to the front end circuit 80b side, and it is amplified by low noise amplifier 86b through switch 88b switched to the receiving side, and is changed into the intermediate frequency signal of a frequency fib by mixer 84b.
[0050] It restores to the intermediate frequency signal by BBP72 through band pass filter 74b, and the data of a packet configuration are obtained from BBP72. Furthermore, a packet configuration is solved by MAC71 and, as for the data of the packet configuration, received data are obtained from MAC71.
[0051] A user performs selection of a radio frequency band, and a setup of a communication channel as one approach by the control units 17 and 47 of the devices 10 and 40 shown in drawing 1 - drawing 3 . The measurement display of the frequency and reinforcement of an electric wave which are devices 10 or 40 or exist in the area of the wireless LAN system of this ** by another device in this case is carried out. A user The communication link electric wave which looks at it and is used by other wireless LAN systems into the area of the wireless LAN system of this **, The channel in the frequency band with which the leakage electric wave of the microwave oven in the area of the wireless LAN system of this ** etc. does not turn into jamming is set up as a communication channel of the wireless LAN system of this **.
[0052] In response to a setup by control units 17 and 47, the appliance control sections 20 and 50 control the Radio Communications Department 70 of devices 10 and 40 to make the set-up channel into a communication channel.
[0053] As an option, it can also constitute so that devices 10 and 40 may set up a communication channel themselves. For example, in starting a communication link between a device 10 and 40, devices 10 and 40 switch a radio frequency to the frequency of each channel in a 2.4GHz band and a 5GHz band one by one, send and receive fixed data, distinguish a channel with the smallest active jamming from the bit error rate of the data after a recovery etc., and they constitute so that the channel may be set up as a communication channel. Moreover, when a device 10 and the electric wave which is blocked to a communication channel by use of a microwave oven etc. during a communication link among 40 occur, devices 10 and 40 can detect it, and it can also constitute so that it may change into a channel without active jamming of a communication channel.
[0054] According to the example of drawing 4 , the number of channels which can be set as coincidence in the same area increases sharply. namely, in using a 2.4GHz band as a radio frequency band The number of channels which can be set as coincidence in the same area In being three channels at the maximum as shown in drawing 13 , and using a 5GHz band as a radio frequency band The number of channels which can be set as coincidence in the same area To being four channels at the maximum, as shown in drawing 14 , in the example of drawing 4 , since a channel setup is possible also for any of a 2.4GHz band and a 5GHz band, the number of channels which can be set as coincidence in the same area becomes seven channels at the maximum.
[0055] Therefore, according to the example of drawing 4 , since each channel of a 2.4GHz band is

used as a communication channel by other wireless LAN systems, for example or since the leakage electric wave of a microwave oven etc. exists, even when it cannot use as a communication channel of the wireless LAN system of this ** Possibility that one channel of the 5GHz bands can be used as a communication channel of the wireless LAN system of this ** becomes large. On the contrary, even when each channel of a 5GHz band cannot use as a communication channel of the wireless LAN system of this **, possibility that one channel of the 2.4GHz bands can be used as a communication channel of the wireless LAN system of this ** becomes large. Therefore, a possibility that a communication link may break off by jamming is also reduced remarkably.

[0056] And in the example of drawing 4 , it is good as a configuration of a device at modification of extent which adds a front end circuit and one intermediate frequency filter, and a big cost rise is not caused.

[0057] (The 2nd example -- Drawing 5) Drawing 5 shows the 2nd example of the 1st operation gestalt. In this example, one front end circuit 80 constitutes the front end section 73 of the Radio Communications Department 70, and this is shared with a 2.4GHz band and a 5GHz band. Moreover, the band pass filter 74 this example of whose is an intermediate frequency filter common to the front end section 73 in the case where an intermediate frequency is made the same in the time of each of a 2.4GHz band and a 5GHz band being chosen is formed.

[0058] Like the front end circuits 80a and 80b of the example of drawing 4 , the front end circuit 80 is constituted by VCO81 for a from office, the mixer 83 for the rise convert at the time of transmission, the mixer 84 for the down convert at the time of reception, the power amplification 85 for transmission, the low noise amplifier 86 for reception, and the switch 88 for a transmission-and-reception change-over, and it is controlled so that the oscillation frequency of VCO81 covers a 2.4GHz band and a 5GHz band.

[0059] However, what is necessary is just to consider as the configuration of using as 2.4GHz bands the station dispatch number obtained by preparing two VCO in the object for 2.4GHz bands, and 5GHz bands, or using the oscillation output of one VCO as 5GHz bands, and carrying out dividing of the oscillation output, when a 2.4GHz band and a 5GHz band cannot be covered by one VCO.

[0060] In this example, the data transmitted are made a packet configuration by MAC71 at the time of transmission. Become irregular by BBP72 and the data of the packet configuration are changed into the intermediate frequency signal of the frequency fi around several 100MHz. A frequency is changed into the RF signal of fa of a 2.4GHz band, or fb of a 5GHz band for the intermediate frequency signal through a band pass filter 74 in the front end circuit 80, and the RF signal is transmitted from an antenna 79.

[0061] At the time of reception, the RF signal of fa of a 2.4GHz band or fb of a 5GHz band is received by the antenna 79, the frequency transmitted from other radio devices is changed into the intermediate frequency signal of a frequency fi in the front end circuit 80, the intermediate frequency signal gets over by BBP72 through a band pass filter 74, and the data of a packet configuration are obtained from BBP72. Furthermore, a packet configuration is solved by MAC71 and, as for the data of the packet configuration, received data are obtained from MAC71.

[0062] Also in this example, like the example of drawing 4 , the number of channels which can be set as coincidence in the same area increases sharply, and a possibility that a communication link may break off decreases remarkably by jamming. Furthermore, in this example, since one front end circuit 80 is shared with a 2.4GHz band and a 5GHz band, the configuration of the front end section 73 becomes easy.

[0063] Moreover, since the configuration of BBP72 which constitutes the strange recovery section can also be simplified while an intermediate frequency filter is made in common with a 2.4GHz band and a 5GHz band when making an intermediate frequency the same with a 2.4GHz band and a 5GHz band like this example, the Radio Communications Department 70 whole can be constituted easily.

[0064] (The 3rd and 4th examples -- Drawing 6 and drawing 7) Drawing 6 is the case where antenna 79a for 2.4GHz bands and antenna 79b for 5GHz bands are prepared as an antenna, when the 3rd example of the 1st operation gestalt is shown and it prepares front end circuit 80a of a 2.4GHz band, and front end circuit 80b of a 5GHz band like the example of drawing 4 .

[0065] Drawing 7 is the case where antenna 79a for 2.4GHz bands and antenna 79b for 5GHz bands are prepared as an antenna, when the 4th example of the 1st operation gestalt is shown and it shares

one front end circuit 80 with a 2.4GHz band and a 5GHz band like the example of drawing 5 .
[0066] In this case, the switch 76 connected to the front end circuit 80 alternatively [Antennas 79a and 79b / any one] is formed in the front end section 73, and it is switched to it by the band selection signal S10 which this showed to drawing 4 .
[0067] According to the example of drawing 6 or drawing 7 , a receiving property can be raised in each the time of a 2.4GHz band being chosen, and when a 5GHz band is chosen.
[0068] [The 2nd operation gestalt -- drawing 8 of a radio communication equipment (Radio Communications Department) - drawing 11] Although the frequency bands accepted by IEEE802.11 specification now are only a 2.4GHz band and a 5GHz band as a radio frequency band of a wireless LAN system, using frequency bands other than this as the radio frequency band of a wireless LAN system may also be technically admitted by the specification of IEEE that it is possible and in the future.
[0069] So, with the 2nd operation gestalt, the Radio Communications Department 70 should be corresponded to three frequency bands, a 2.4GHz band, a 5GHz band, and the 3rd frequency band. The 3rd frequency band is a frequency band with a 2.4GHz band and a 5GHz band more expensive than a different frequency band, for example, a 5GHz band.
[0070] (The 1st example -- Drawing 8) Drawing 8 shows the 1st example of the 2nd operation gestalt. In this example, it shall have the switches 75a and 75b which are equipped with front end circuit 80a of a 2.4GHz band, front end circuit 80b of a 5GHz band, and front end circuit 80c of the 3rd frequency band, and connect alternatively [one] of these three front end circuits 80a, 80b, and 80c the front end section 73 of the Radio Communications Department 70 to the common antenna 79.
[0071] The front end circuits 80a, 80b, and 80c are constituted like the front end circuits 80a and 80b of the example of drawing 4 , respectively. When a 2.4GHz band is chosen, switch 75a with the band selection signal S11 to the front end circuit 80a side When a 5GHz band or the 3rd frequency band is chosen, it is switched to the switch 75b side, respectively. Switch 75b When a 5GHz band is chosen and the 3rd frequency band is chosen as the front end circuit 80b side by the band selection signal S12, it is switched to the front end circuit 80c side, respectively.
[0072] Moreover, the band pass filters 74a, 74b, and 74c this example of whose is the intermediate frequency filter of business at the front end section 73, respectively in the case where an intermediate frequency is changed in the time of each of a 2.4GHz band, a 5GHz band, and the 3rd frequency band being chosen are formed.
[0073] This example is the same as the example of drawing 4 of the 1st operation gestalt except for the point that the number of radio frequency bands is three, and a frequency fc is a radio frequency when the 3rd frequency band is chosen.
[0074] According to this example, the number of channels which can be set as coincidence in the same area increases from each example of the 1st operation gestalt, and a possibility that a communication link may break off by jamming decreases from each example of the 1st operation gestalt.
[0075] (The 2nd example -- Drawing 9) Drawing 9 shows the 2nd example of the 2nd operation gestalt. In this example, one front end circuit 80 constitutes the front end section 73 of the Radio Communications Department 70, and this is shared with a 2.4GHz band, a 5GHz band, and the 3rd frequency band. Moreover, the band pass filter 74 this example of whose is an intermediate frequency filter common to the front end section 73 in the case where an intermediate frequency is made the same in the time of each of a 2.4GHz band, a 5GHz band, and the 3rd frequency band being chosen is formed.
[0076] This example is the same as the example of drawing 5 of the 1st operation gestalt except for the point that the number of radio frequency bands is three.
[0077] (The 3rd and 4th examples -- Drawing 10 and drawing 11 R> 1) Drawing 10 [when the 3rd example of the 2nd operation gestalt is shown and it prepares front end circuit 80a of a 2.4GHz band, front end circuit 80b of a 5GHz band, and front end circuit 80c of the 3rd frequency band like the example of drawing 8] It is the case where antenna 79a for 2.4GHz bands, antenna 79b for 5GHz bands, and antenna 79c for the 3rd frequency band are prepared as an antenna.
[0078] Drawing 11 is the case where antenna 79a for 2.4GHz bands, antenna 79b for 5GHz bands,

and antenna 79c for the 3rd frequency band are prepared as an antenna, when the 4th example of the 2nd operation gestalt is shown and it shares one front end circuit 80 like the example of drawing 9 with a 2.4GHz band, a 5GHz band, and the 3rd frequency band.

[0079] In this case, the switches 76a and 76b connected to the front end circuit 80 alternatively [Antennas 79a, 79b, and 79c / any one] are formed in the front end section 73, and it is switched to it by the band selection signals S11 and S12 which these showed to drawing 8 .

[0080] The example of drawing 10 and drawing 11 is the same as drawing 6 of the 1st operation gestalt, and the example of drawing 7 except for the point that the number of radio frequency bands is three, respectively.

[0081] Operation gestalt [besides [ ], or example] when preparing a front end circuit for every frequency band like the example of drawing 4 , drawing 6 , drawing 8 , or drawing 10 , each example mentioned above Although it is the case where an intermediate frequency is made the same with each frequency band when changing an intermediate frequency for every frequency band and sharing one front end circuit with each frequency band like the example of drawing 5 , drawing 7 , drawing 9 , or drawing 11 On the contrary, when preparing a front end circuit for every frequency band, an intermediate frequency is made the same with each frequency band, and when sharing one front end circuit with each frequency band, an intermediate frequency can also be changed for every frequency band.

[0082] Moreover, the Radio Communications Department 70 should correspond to four or more frequency bands, such as a 2.4GHz band, a 5GHz band, the 3rd frequency band, and the 4th frequency band.

[0083] Moreover, for example, the tuner which can receive digital broadcasting can also be made to build in as a radio device in the device 10 as a base terminal shown in drawing 1 R> 1.

[0084] Furthermore, a wireless LAN system can also be built with one base terminal, two or more portable terminals, or two or more base terminals, one portable terminal or two or more base terminals and two or more portable terminals. Moreover, when special, a certain radio device can be made only into for transmission, and a certain radio device can also be made [******] into reception only.

[0085]

[Effect of the Invention] As mentioned above, according to this invention, the number of channels which can be set as coincidence in the same area can be made to increase sharply, and a possibility that a communication link may break off by jamming can be reduced remarkably.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing showing an example of the wireless LAN system using the radio device of this invention.
[Drawing 2] It is drawing showing an example of the radio device as a base terminal.
[Drawing 3] It is drawing showing an example of the radio device as a portable terminal.
[Drawing 4] It is drawing showing the 1st example of the 1st operation gestalt.
[Drawing 5] It is drawing showing the 2nd example of the 1st operation gestalt.
[Drawing 6] It is drawing showing the 3rd example of the 1st operation gestalt.
[Drawing 7] It is drawing showing the 4th example of the 1st operation gestalt.
[Drawing 8] It is drawing showing the 1st example of the 2nd operation gestalt.
[Drawing 9] It is drawing showing the 2nd example of the 2nd operation gestalt.
[Drawing 10] It is drawing showing the 3rd example of the 2nd operation gestalt.
[Drawing 11] It is drawing showing the 4th example of the 2nd operation gestalt.
[Drawing 12] It is drawing showing an example of the conventional radio communication equipment.
[Drawing 13] It is drawing showing the channel configuration of a 2.4GHz band.
[Drawing 14] It is drawing showing the channel configuration of a 5GHz band.
[Description of Notations]
Since all were described all over drawing about the principal part, it omits here.

[Translation done.]

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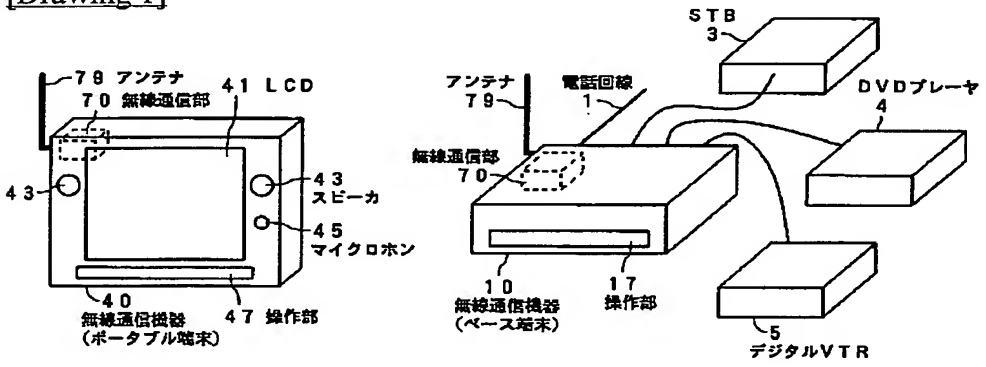
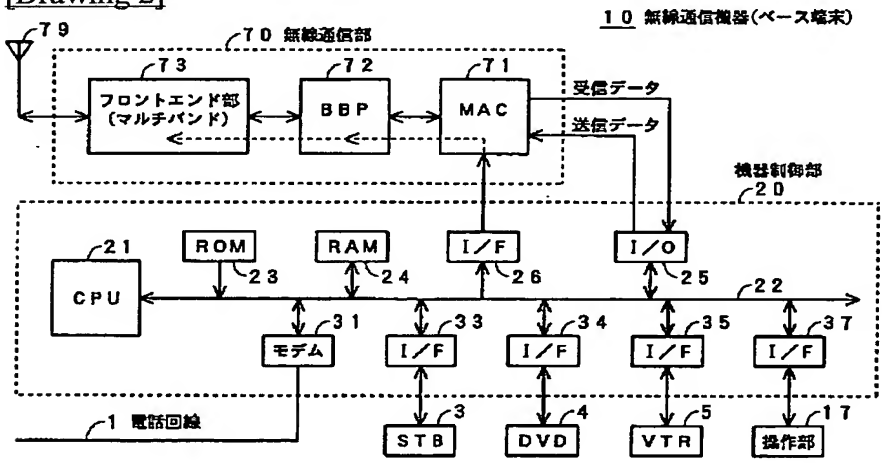
DRAWINGS

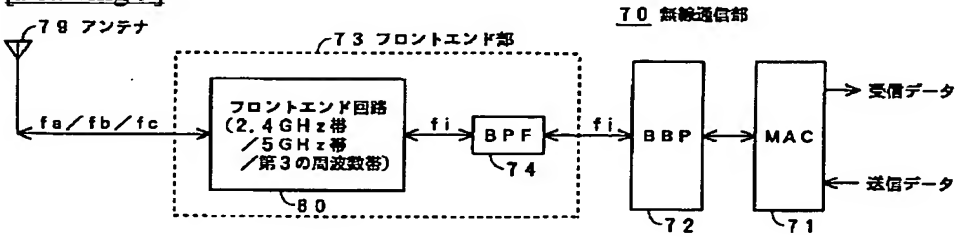
[Drawing 1]



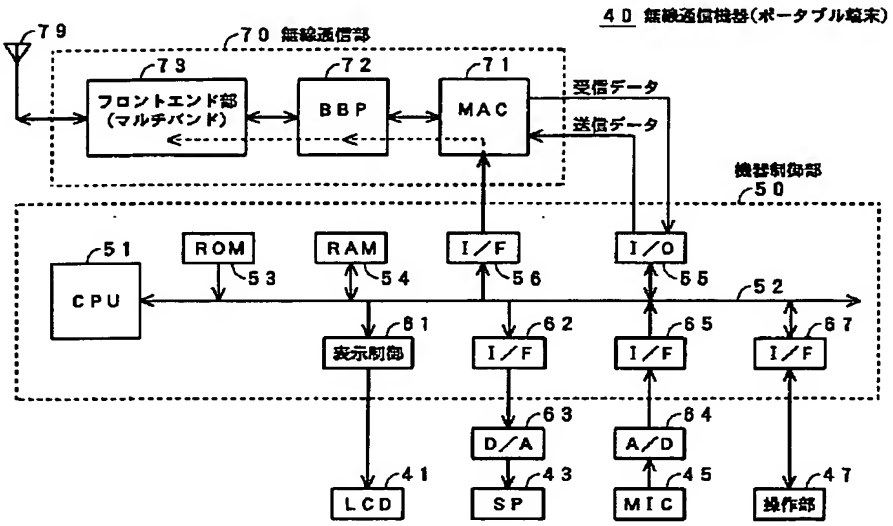
[Drawing 2]



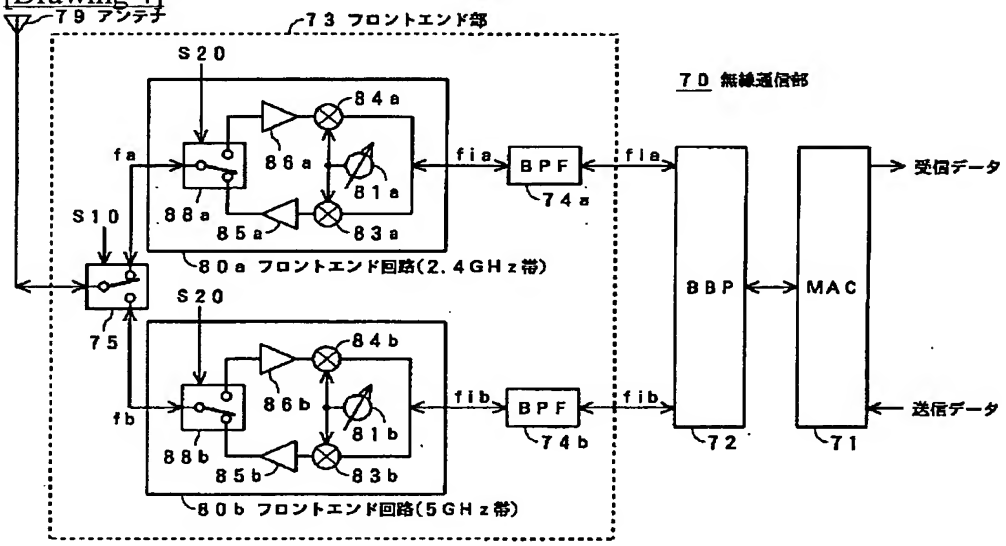
[Drawing 9]



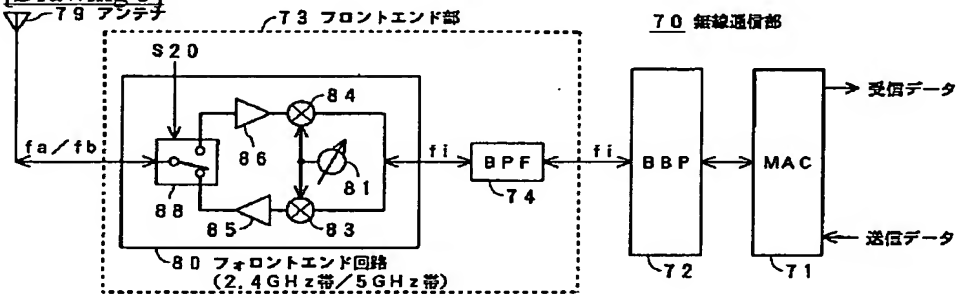
[Drawing 3]



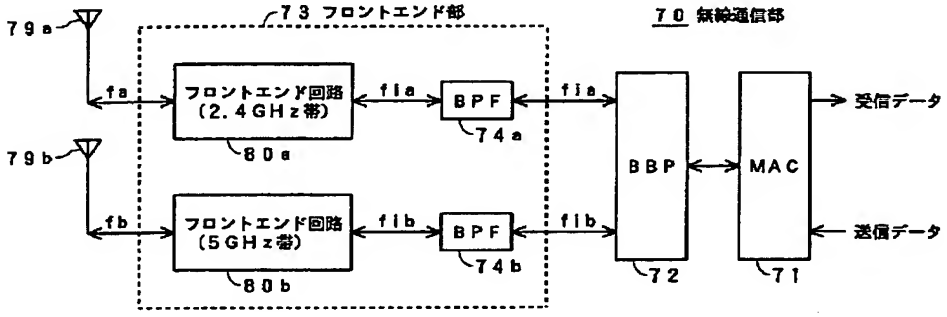
[Drawing 4]



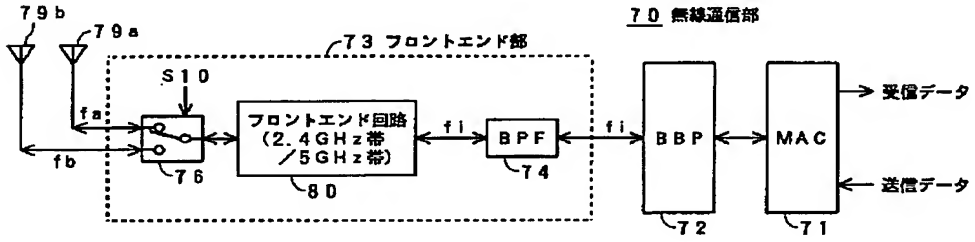
[Drawing 5]



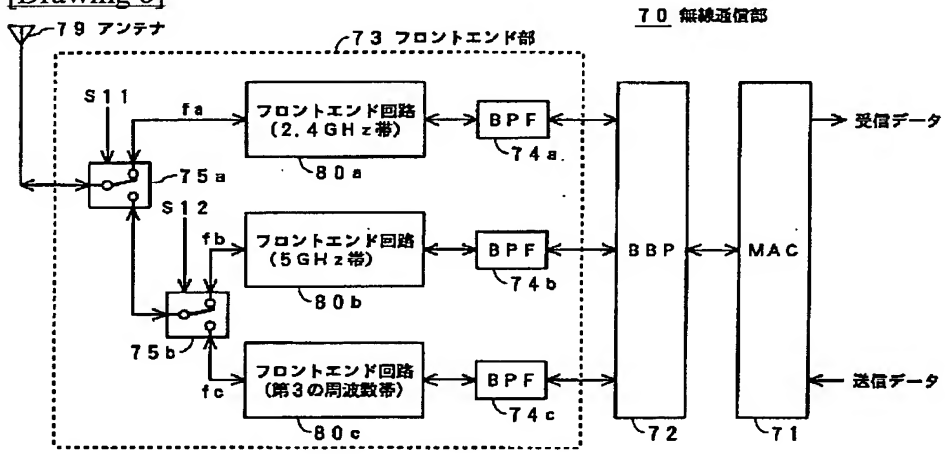
[Drawing 6]



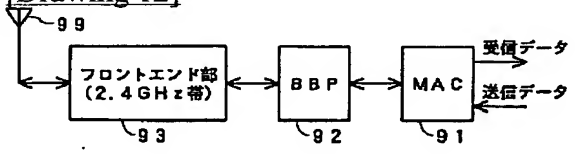
[Drawing 7]



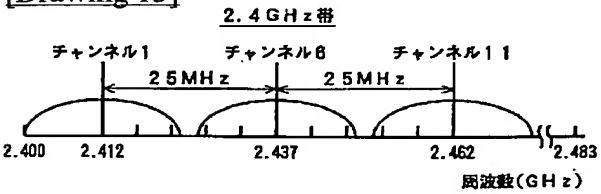
[Drawing 8]



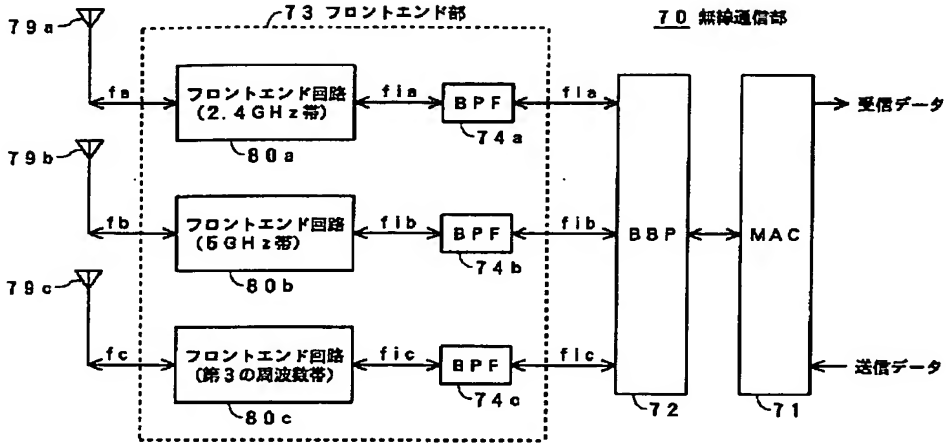
[Drawing 12]



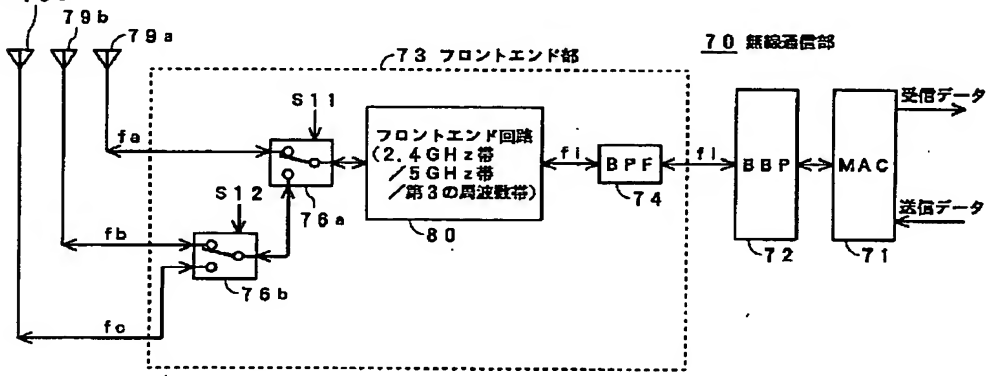
[Drawing 13]



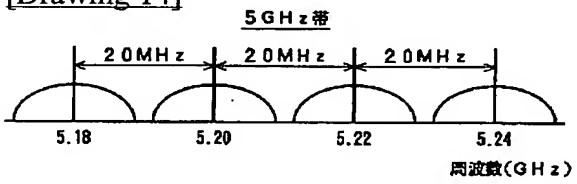
[Drawing 10]



[Drawing 11]



[Drawing 14]



[Translation done.]